

**State of California  
AIR RESOURCES BOARD**

**EXECUTIVE ORDER DE-05-011**

Pursuant to the authority vested in the Air Resources Board by Health and Safety Code, Division 26, Part 5, Chapter 2; and pursuant to the authority vested in the undersigned by Health and Safety Code Section 39515 and 39616 and Executive Order G-02-003;

Relating to Verification under Sections 2700 through 2710 of Title 13 of the California Code of Regulations

Johnson Matthey, Inc.  
Continuously Regenerating Technology (CRT®) Particulate Filter

The California Air Resources Board (ARB) staff has reviewed Johnson Matthey's request for verification of the CRT® diesel particulate filter (DPF). Based on an evaluation of the data provided, and pursuant to the terms and conditions specified below, the Executive Officer of the ARB hereby finds that the CRT® filter reduces emissions of diesel particulate matter (PM) consistent with a Level 3 device (greater than or equal to 85 percent reductions) (Title 13 California Code of Regulations (CCR) Sections 2702 (f) and (g) and Section 2708). Accordingly, the Executive Officer determines that the system merits verification for stationary emergency or prime generators, subject to the terms and conditions specified below, as a Level 3 system, for use with stationary prime and emergency generators using the engine families listed in Attachment 1 and meeting Tier 1, 2, or 3 PM certification levels.

This verification is subject to the following terms and conditions:

- The engine must be used in a stationary application associated with prime or emergency standby generators.
- The engines are model years 1996 through 2006 having the engine family names listed in Attachment 1 and certified to Tier 1, 2, or 3 PM.
- The engine must be in their original certified configuration.
- The engine must not employ exhaust gas recirculation.
- The engine must not have a pre-existing oxidation catalyst.
- The engine must not have a pre-existing diesel particulate filter.
- The engine can be a two or four-stroke.
- The engine can be turbocharged or naturally-aspirated.
- The engine must be certified in California.
- The engine must be certified at a particulate matter emission level equal or less than 0.4 g/bhp-hr (as tested on an appropriate steady-state certification cycle outlined in the ARB off-road regulations – similar to ISO 8178 D2).
- Johnson Matthey must review actual operating conditions (duty cycle, baseline emissions, exhaust temperature profiles, and engine backpressure) prior to retrofitting an engine with the CRT® filter to ensure compatibility.
- The engine should be well maintained and not consume lubricating oil at a rate greater than that specified by the engine manufacturer.

- The engines must be operated on fuel that has a sulfur content of no more than 50 parts per million by weight.
- The other terms and conditions specified below.

Table 1: Conditions for the CRT<sup>®</sup> filter

Parameter	Value
Application	Stationary Power Generation
Size Range	No restriction
Engine Type	Diesel, with or without turbocharger, 0.4 g/bhp-hr or less of PM10
Minimum Exhaust Temperature for Filter Regeneration	The engine must operate at a load level to achieve sufficient exhaust temperature (240° C) for regeneration for 40% of the duty cycle. Operation at lower temperatures is allowed up to 200 consecutive hours, but the CRT <sup>®</sup> filter may require a maintenance step of accumulated soot burning by operating above 300° C for 5 to 10 hours.
Maximum Consecutive Minutes at Idle	720 minutes
NOx/PM Ratio Requirements	NOx/PM ratio of at least 15 at 300° C or above and 20 at temperatures below 300° C.
Number of Cold Starts Before Regeneration Required	24 cold starts with 30 minute idle sessions
Number of Hours of Operation Before Cleaning of Filter Required	Up to 5000 hours - application specific.
Fuel	California low sulfur diesel with 50 ppm sulfur content limit. Biodiesel is not acceptable for this verification
Verification Level	Level 3 Verification: At least 85% reduction of particulate matter.

The CRT<sup>®</sup> filter consists of an oxidation catalyst and diesel particulate filter, referred to as a catalyzed passive continuously regenerated diesel particulate filter, and a backpressure monitor and data logger combination, CRTdm.

This Executive Order is valid provided that installation instructions for CRT<sup>®</sup> filter do not recommend tuning the engine to specifications different from those specified by the engine manufacturer.

Changes made to the design or operating conditions of CRT<sup>®</sup> filter which adversely affect the performance of the engine's pollution control system shall invalidate this Executive Order.

Changes to the CRT<sup>®</sup> filter are not permitted without ARB approval. ARB must be notified in writing of any changes to any part of CRT<sup>®</sup> filter. Any changes to the device

must be evaluated and approved by ARB. Failure to do so shall invalidate this Executive Order.

Marketing of the CRT<sup>®</sup> filter using identification other than that shown in this Executive Order or for an application other than that listed in this Executive Order shall be prohibited unless prior approval is obtained from ARB.

As specified in the Diesel Emission Control Strategy Verification Procedure (Title 13 CCR Section 2706 (g)), the ARB assigns each Diesel Emission Control Strategy a family name. The designated family name for the verification as outlined above is:

**CA/JMI/2005/PM3/N00/ST/DPF01**

Additionally, as stated in the Diesel Emission Control Strategy Verification Procedure, Johnson Matthey, Inc., is responsible for honoring their warranty (Section 2707) and conducting in-use compliance testing (Section 2709).

In addition to the foregoing, ARB reserves the right in the future to review this Executive Order and the verification provided herein to assure that the verified add-on or modified part continues to meet the standards and procedures of California Code of Regulations, Title 13, Section 2222, et seq and California Code of Regulations, Title 13, Sections 2700 through 2710.

Systems verified under this Executive Order shall conform to all applicable California emissions regulations. This Executive Order does not release Johnson Matthey, Inc., from complying with all other applicable regulations.

Violation of any of the above conditions shall be grounds for revocation of this Executive Order.

Executed at Sacramento, California, this 5<sup>th</sup> day of April 2006.

Catherine Witherspoon  
Executive Officer  
by

/s/

Robert Fletcher, Chief  
Stationary Source Division

Attachment 1: ARB Approved Model Year 1996 to 2006 Engine Families for the CRT<sup>®</sup> filter.